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09/803,404	03/09/2001	Takahiro Fukuhara	450100-03057	8710
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EXAMINER CHEN, WENPENG				
ART UNIT		PAPER NUMBER		
2624				

DATE MAILED: 12/06/2004

Please find below and/or attached an Office communication concerning this application or proceeding.

## Office Action Summary

**Application No.**

09/803,404

**Applicant(s)**

FUKUHARA ET AL.

**Examiner**

Wenpeng Chen

**Art Unit**

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-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

### Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

### Status

- 1) ☒ Responsive to communication(s) filed on 07 September 2004.
- 2a) ☒ This action is **FINAL**. 2b) ☐ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

### Disposition of Claims

- 4) ☒ Claim(s) 1-27 is/are pending in the application.
- 4a) Of the above claim(s) 14-23,26 and 27 is/are withdrawn from consideration.
- 5) ☐ Claim(s) \_\_\_\_\_ is/are allowed.
- 6) ☒ Claim(s) 1-13,24 and 25 is/are rejected.
- 7) ☐ Claim(s) \_\_\_\_\_ is/are objected to.
- 8) ☐ Claim(s) \_\_\_\_\_ are subject to restriction and/or election requirement.

### Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on \_\_\_\_\_ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.  
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).  
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

### Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some \* c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
  2. ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_\_.
  3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

\* See the attached detailed Office action for a list of the certified copies not received.

### Attachment(s)

- |  |   |
|--|---|
| 1) <input type="checkbox"/> Notice of References Cited (PTO-892)   | 4) <input type="checkbox"/> Interview Summary (PTO-413)<br>Paper No(s)/Mail Date. _____ |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948)                                   | 5) <input type="checkbox"/> Notice of Informal Patent Application (PTO-152)             |
| 3) <input type="checkbox"/> Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08)<br>Paper No(s)/Mail Date _____ | 6) <input type="checkbox"/> Other: _____  |

**Examiner's responses to Applicant's remark**

1. Applicant's amendments filed on 9/7/2004 overcome the objection to specification set forth in paper #3.

2. Applicant's arguments filed on 9/7/2004 with respect to all the pending claims have been considered but are moot in view of the new ground(s) of rejection due to the amendments.

3. To make the Examiner's position clearer, some of the Applicants' arguments are answered below.

a. Applicants' argument -- As shown in Fig. 6-7, Chui stores the entire image. Chui does not teach processing tiles as sufficient lines comprising each tile are stored in memory.

Examiner's response -- The Examiner does not agree. First, as shown in step 300 of Fig. 7A, only one tile of the image shown in Fig. 2 is stored in the working memory. Second as shown in Figs. 8-9, when the rows or columns stored in buffers have sufficient numbers, a corresponding wavelet transform is carried out. The cited passages of Chui meet the claimed limitations.

b. Applicants' argument -- Neither Ogata nor Chui teaches "block picture analysis."

Examiner's response -- The Examiner did not rely on Ogata nor Chui to teach "block picture analysis" as evident in the previous Office Action. The Examiner relied on Ribas-Corberat. The Applicants did not rebut this point.

*Claim Rejections - 35 USC § 112*

4. The following is a quotation of the first paragraph of 35 U.S.C. 112:

The specification shall contain a written description of the invention, and of the manner and process of making and using it, in such full, clear, concise, and exact terms as to enable any person skilled in the art to which it pertains, or with which it is most nearly connected, to make and use the same and shall set forth the best mode contemplated by the inventor of carrying out his invention.

5. Claims 1-13 and 24-25 are rejected under 35 U.S.C. 112, first paragraph, because of the following reasons. The specification does not enable any person skilled in the art to which it pertains, or with which it is most nearly connected, to implement the invention commensurate in scope with these claims.

Claims 1 and 24 call for a limitation A of "using weighting coefficients of a table provided at the outset for each block area in a sub-band generated by the wavelet transform." Because the specification, while being enabling for "using weighting coefficients of a table provided at the outset of the wavelet transform", it does not reasonably provide enablement for limitation A including "a table provided at the outset for each block area." The table as explained in the specification is provided at the time the wavelet transform is performed. For each block, a coefficient from the table is retrieved and a weighting coefficient associated with the block is provided to generate an ultimate quantization coefficient. Evidently, the table is not provided at the outset for each block area.

Claims 7 and 25 call for a limitation B of "using ... a table of weighting coefficients for each block area in a sub-band." Similar to the explanation above for Claims 1 and 24, the

specification does not teach "a table of weighting coefficients for each block area." The table is for each sub-band.

### ***Claim Interpretation***

6. For examining all the pending claims over the prior art, the Examiner made the following interpretation.

-- In Claims 1 and 24, change a limitation of "using weighting coefficients of a table provided at the outset for each block area in a sub-band generated by the wavelet transform" to "using, for each block area in a sub-band, weighting coefficients of a table provided at the outset of the wavelet transform".

-- In Claims 7 and 25, change a limitation of "using both a table of weighting coefficients for each block area in a sub-band generated by the wavelet transform and weighting coefficients derived from the analyzed motion information" to "using, for each block area in a sub-band, both a table of weighting coefficients generated by the wavelet transform and weighting coefficients derived from the analyzed motion information "

### ***Claim Rejections - 35 USC § 103***

7. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

8. The interpreted Claims 1-3, 5-10, 12-13, and 24-25 are rejected under 35 U.S.C. 103(a) as being unpatentable over Ogata et al. (US patent 5,926,791 cited previously) in view of Chui et al. (US patent 6,229,926 cited previously) and Ribas-Corberat et al. (US patent 6,111,991 cited previously.)

For Claims 1-3 and 5-6, Ogata teaches a picture encoding apparatus comprising:

-- memory means for writing and storing an input picture; (In Fig. 6, the input data are read and processed with LPF and HPF. The filtering processes inherently require memory for the recited purpose.)

-- wavelet transform means for applying wavelet transform in the horizontal and vertical directions; (Fig. 6)

-- quantization means for quantizing wavelet transform coefficients obtained from said wavelet transform means; (56a-56g of Fig. 6)

-- entropy encoding means for entropy encoding quantized coefficients from said quantization means; (encoder 57 of Fig. 6; column 6, lines 54-61; column 10, lines 50-61; column 12, lines 25-38)

-- quantization means quantizing the wavelet transform coefficients, *using weighting coefficients of a table provided at the outset for each sub-band generated on wavelet transform* and weighting coefficients found from one block area picture forming a picture to another; (column 6, lines 41-53; column 10, lines 50-61; column 12, lines 25-38; Each quantization step of 56a-56g in Fig. 6 quantizes every coefficients in a subband. The collection of the quantization steps is a table.)

-- wherein weighting coefficients of said table of said quantization means provided from the outset for each sub-band are such that, the larger the number of sub-band splitting stages, the larger become the weighting coefficients and the higher becomes the priority placed on the weighting coefficients, and conversely, the smaller the number of the splitting stages, the smaller become the weighting coefficients and the lower becomes the priority placed on the weighting coefficients, and such that, in sub-bands of the same splitting stage, the weighting coefficients become smaller for the high range than for the low range to decrease the priority of the weighting coefficients; (column 6, lines 41-53; column 10, lines 50-61; column 12, lines 25-38)

-- wherein said input picture is a continuous picture of a plurality of frames and wherein the input continuous picture is sequentially encoded from one frame to another. (column 1, lines 12-18; Video signals are processed.)

However, Ogata does not teach the features related to the line-by-line wavelet process of Claim 1.

Chui teaches a picture encoding apparatus with wavelet compression tile-by-tile comprising:

-- memory means for writing and storing an input picture from one line to another; (Figs. 7-8 and 9; Table 2; passages discussing Figs 7-8 and 9 for example column 9, line 53 to column 10, line 25)

-- wavelet transform means for applying wavelet transform in the horizontal and vertical directions each time a picture stored in said memory means reaches the number of lines required for wavelet transform; (Figs. 7-8 and 9; Table 2; passages discussing Figs 7-8 and 9 for example column 9, line 53 to column 10, line 25)

-- quantization means for quantizing wavelet transform coefficients obtained from said wavelet transform means; (Fig. 2)

-- wherein quantization coefficients obtained from said quantization means are collected in terms of a block as a unit, and wherein, at a time point a given block is filled with quantization coefficients, entropy encoding is performed by said entropy encoding means; (Fig. 2; The wavelet coefficients of a tile is collected as a unit and then encoded.)

-- wherein said input picture is split into a plurality of rectangular tiles and written in said memory means. (Fig. 2; The image is divided into tiles.)

It is desirable to process images in a system with moderate amount of working memory such as a digital camera. It would have been obvious to one of ordinary skill in the art, at the time of the invention, to apply Chui's teaching to decompose Ogata's images into wavelet subbands in an image-tile version and then quantize the resulted wavelet coefficients with Ogata's approach because the combination provides high-efficient wavelet compression in a system with moderate amount of working memory.

As discussed above, the combination of Ogata and Chui teaches the memory means, wavelet transform means, and the entropy encoding means recited in Claims 7 and 10, 12, and 13.

However, the combination of Ogata and Chui does not teach the features related to "block picture analysis means" and "for each block area using the weighting coefficients of a table."

Ribas-Corbera teaches a dynamic quantization system comprising:

-- block picture analysis means for analyzing the motion information in a block picture and the degree of fineness of the texture for each block area in said input picture; (column 3, lines 46-58; column 5, lines 1-16; The energy of a block is the degree of fineness of the texture for each block area.)



-- means for computing weighting coefficients for quantization of said block picture area using the analysis information from said block picture analysis means; (eq. (7) in column 6)

-- wherein said quantization means includes means for determining ultimate weighting coefficients for quantization. (column 5, line 34 to column 6, line 39; The optimal quantization values are generated.)

It is further desirable to reduce distortion to an image by assigning different quantization steps to different area of the image. The block of Ribas-Corbera can be of any size such as that Chui's tile. It would have been obvious to one of ordinary skill in the art, at the time of the invention, to apply Ribas-Corbera's teaching to analyze the energy and motion of each Chui's tile that is a block and use the energy and motion to adjust Ogata's all of quantization steps of all subbands associated with the tile, because the overall combination reduces distortion to an image after wavelet compression and decompression. Because Ribas-Corbera selects optimal quantization for each tile that is a block area, the combination thus teaches:

-- quantizing the wavelet transform coefficients, using for each block area weighting coefficients of a table provided at the outset of the wavelet transform;

-- wherein said quantization means includes means for determining ultimate weighting coefficients for quantization using, for each block area, both a table of weighting coefficients generated by the wavelet transform and weighting coefficients derived from the analyzed motion information.

The above-cited passages also teach the corresponding method of Claims 24-25.

9. The interpreted Claims 4 and 11 are rejected under 35 U.S.C. 103(a) as being unpatentable over Ogata et al. (US patent 5,926,791) in view of Chui et al. (US patent 6,229,926) and Ribas-Corbera et al. (US patent 6,111,991) as discussed above, and further in view of Keith et al. (US patent 5,881,176.)

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The combination of Ogata, Chui, and Ribas-Corberat teaches the parental Claims 3 and 10. However, it does not teach the feature related to bit planes recited in Claims 4 and 11.

Keith teaches coding with (1) wavelet transform in a tile format and (2) entropy encoder with bit plane, comprising:

-- wherein said entropy encoding means resolve quantization coefficients in said block into bit planes composed of binary data and executes arithmetic encoding depending on the occurrence probability distribution of symbols in each bit plane, and wherein the estimation of said probability distribution is performed only on data in a predetermined block. (Figs. 12, 14)

It is desirable to facilitate selecting parts of compressed data based onto structure, such as the frequency band and importance level for various users. It would have been obvious to one of ordinary skill in the art, at the time of the invention, to apply Keith's bit plane encoding approach to encode the quantized wavelet coefficients generated in the system taught by the combination of Ogata, Chui, and Ribas-Corberat, because the overall combination provides flexibility of the compressed data for various users.

### Conclusion

10. Applicant's amendment necessitated the new ground(s) of rejection presented in this Office action. Accordingly, **THIS ACTION IS MADE FINAL**. See MPEP § 706.07(a). Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire **THREE MONTHS** from the mailing date of this action. In the event a first reply is filed within **TWO**

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MONTHS of the mailing date of this final action and the advisory action is not mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the date of this final action.

11. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Wenpeng Chen whose telephone number is 703 306-2796. The examiner can normally be reached on 8:30 am - 5:00 pm.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, David K Moore can be reached on 703 308-7452. The fax phone numbers for the organization where this application or proceeding is assigned are 703-872-9306 for regular communications and 703-872-9306 for After Final communications. TC 2600's customer service number is 703-306-0377.

Any inquiry of a general nature or relating to the status of this application or proceeding should be directed to the receptionist whose telephone number is 703 305-4700.

Wenpeng Chen  
Examiner  
Art Unit 2624

December 3, 2004

